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09/492,265	01/27/2000	Yi-Hsien Hao	34556/JFO/B600	9668

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EXAMINER

NG, CHRISTINE Y

ART UNIT	PAPER NUMBER
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2616

MAIL DATE	DELIVERY MODE
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08/20/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/492,265

Applicant(s)

HAO ET AL.

Examiner

Christine Ng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 January 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,021,132 to Muller et al in view of U.S. Patent No. 6,529,519 to Steiner et al, and in further in view of U.S. Patent No. 6,427,185 to Ryals et al.

Regarding claims 1, 8, 9, 11, 13, 15, 21, 28, 32-34, 40, 52 and 57, Muller teaches a memory structure (e.g. see FIG. 1 and col. 3, line 52 - col. 7, line 40) comprising an Address Resolution Table (e.g., address table stored in forwarding memory 113, see col. 4, lines 32-34) for resolving addresses in a packet-based network switch (101); and a Packet Storage Table (e.g., shared memory manager 220 locally storing pointers which point to buffers that contain packet data, see col. 6, lines 43-63) adapted to receive a packet for storage in the packet-based network switch and sharing a preselected portion of memory with the Address Resolution Table, wherein Address Resolution Table utilizes a preselected portion of memory comprising the forwarding and filtering database 140 (FIGS. 1 and 2). Furthermore, regarding claims 8, 13, 32, 52 and 57, Muller teaches the Address Resolution Table (113) has an associative memory structure (e.g., associative memory 114 within database 140 and further coupled to switch fabric 210). Still further, regarding claims 8, 9, 13 and 32, Muller teaches the

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Packet Storage Table is adapted to receive at least one of each of a Packet Data Address (e.g., within the header received from forwarding decision, see col. 5, line 46 - col. 6, line 40) and a Packet Data Value (e.g., a priority indication, see col. 6, line 21). Additionally, regarding claims 11, 33, 52 and 57, Muller teaches the associative memory structure (114) is a direct-mapped/one-way associative memory structure, such that the associative memory structure (114) stores data associated with each entry in the Address Resolution Table (113) (e.g., see col. 4, lines 30-37).

However, Muller may not specifically disclose a single buffer per packet mechanism or an index key.

Steiner also teaches a memory structure for buffering packets. More specifically, Steiner teaches an improvement for packet buffering wherein a single buffer per packet mechanism (e.g., single "page" buffer per packet, see col. 5, lines 54-65 and col. 7, lines 55-62) is configured to receive an individual packet for enabling only one transmit descriptor (e.g., one pointer in table of pointers, see col. 5, lines 54-65 and col. 7, line 63 - col. 8, line 3 regarding addresses) read per the individual packet and to enable an execution of a single access in order to locate an entire packet to be transmitted (e.g., see col. 5, lines 54-58 wherein each page comprises a single packet, and see col. 7, line 63 - col. 8, line 3 wherein an access of an address of a page therefore enables location of an entire packet). The teachings of Steiner resolve the memory fragmentation problem of gaps (e.g., see col. 2, lines 37-45) while conserving processor resources (e.g., see col. 2, line 46 - col. 3, line 10), yielding a buffer with reduced processor loading and increased power-conservation (e.g., see col. 3, line 11 - col. 4,

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line 15). Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to apply the teachings of Steiner to the system of Muller in order to provide buffering with reduced processor loading and increased power-conservation.

However, Muller in view of Steiner may not specifically disclose a key to index a location within the Address Resolution Table, wherein the key is a predefined portion of a packet destination address.

Ryals et al disclose in Figure 4 a switching device with a local table 410 (address resolution table) that contains entries to different destination addresses. Upon receiving a packet, the control unit 406 inspects the local table 410 to determine whether an entry associated with the destination address resides in table 410. If the local table 140 contains an entry associated with the destination address, appropriate routing is determined based on the information in the entry. The entry that corresponds to a destination address is stored in the local table at a location based on an index (key), wherein a portion of the destination address is used as the index to the entry. Refer to Column 9, line 15 to Column 10, line 17. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a key to index a location within the Address Resolution Table, wherein the key is a predefined portion of a packet destination address. One would be motivated to do so so that all packets with the same destination can be routed to the same output port according to a table; a portion of the destination address is used as an index into the table in order to conserve memory.

Regarding claims 2, 18 and 37, Muller further teaches the structure comprises a Transmit Descriptor Table (e.g., output queue, see col. 7, lines 20-25) being associated with a corresponding packet-based network transmit port (output port 206); and a Free Buffer Pool (e.g., shared memory 230 comprising free pool of buffers, see col. 7, lines 25-67) having plural memory buffers each having a pre-determined number of memory locations (e.g., memory lines) associated therewith (e.g., see col. 8, lines 37-51).

Regarding claims 3, 29, 47 and 59, Muller teaches the structure implements an IEEE Standard 802.3 communication protocol (e.g., see col. 3, lines 57-62).

Regarding claims 4, 30, 48, 53 and 60, Muller teaches the switch comprises plural ports (e.g., see FIG. 2 input and output ports 206).

Regarding claims 5, 49, 50, 54 and 55, Muller in view of Steiner teach the structure discussed above regarding claims 4, 47 and 52, however, may not specifically require that the switch comprise at least 4 ports or at least 8 ports. However, Muller further teaches a plurality of ports are included (e.g., see FIG. 2), and Muller does not limit the scope of the invention to a specific number of ports. Thus, the teachings of Muller clearly encompass the limitations of providing at least 4 ports or at least 8 ports. Moreover, it is generally considered to be within the ordinary skill in the art to adjust, vary, select or optimize the numerical parameters or values of any system absent a showing of criticality in a particular recited value. The burden of showing criticality is on Appellant. In re Mason, 87 F.2d 370, 32 USPQ 242 (CCPA 1937); Marconi Wireless Telegraph Co. v. U.S., 320 U.S. 1, 57 USPQ 471 (1943); In re Schneider, 148 F.2d 108,

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65 USPQ 129 (CCPA 1945); In re Aller, 220 F.2d 454, 105 USPQ 233 (CCPA 1955); In re Saether, 492 F.2d 849, 181 USPQ 36 (CCPA 1974); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to have the switch comprise at least 4 ports or at least 8 ports since the teachings of Muller clearly encompass the limitations of providing at least 4 ports or at least 8 ports and since it is generally considered to be within the ordinary skill in the art to adjust, vary, select or optimize the numerical parameters or values of any system absent a showing of criticality in a particular recited value

Regarding claims 6, 14 and 58, Muller teaches the associative memory comprises a search structure (e.g., search engine within coupled switch fabric block 210, see col. 6, lines 4-7).

Regarding claims 7, 12, 22, 31, 41, 51 and 56, Muller in view of Steiner teach the structure discussed above regarding claims 3, 11, 21, 28, 34, 45 and 52, however, may not specifically disclose a specific number of memory accesses required per Ethernet frame. However, Regarding claims 7, 12, 22, 31, 41, 51 and 56, these claims were rejected in a previous office action by the Examiner taking official notice that the limitations recited in these claims are well known in the art. That is, it is commonly known in the art to perform, e.g., one cycle per Ethernet frame for operations such as address resolution/learning and transmission read/write. In Applicant's response to the previous office action, Applicant has not traversed the Examiner's assertion of official

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notice or Applicant's traverse is not adequate. Therefore, in accordance with MPEP 2144.03(C), the limitations recited in these claims comprise well-known art and are hereafter taken to be admitted prior art.

Regarding claim 10, as discussed above regarding claims 2, 18 and 37, Muller in view of Steiner teach the structure comprises a Transmit Descriptor Table (e.g., output queue, see col. 7, lines 20-25 of Muller) being associated with a corresponding packet-based network transmit port (output port 206); and a Free Buffer Pool (e.g., shared memory 230 comprising free pool of buffers, see col. 7, lines 25-67) having plural memory buffers each having a pre-determined number of memory locations (e.g., memory lines) associated therewith (e.g., see col. 8, lines 37-51). However, Muller in view of Steiner may not specifically disclose receiving a Table Descriptor Address and a Table Descriptor Value at the Transmit Descriptor Table. Nevertheless, Muller clearly suggests that the Transmit Descriptor Table is adapted to receive a Table Descriptor Address and a Table Descriptor Value by way of previous example, wherein Muller teaches Address and Value are received by the Packet Storage Table as discussed above regarding claims 8, 9, 13 and 32, and wherein Muller further teaches in steps (1) - (5) (see col. 5, lines 46-65) processing packets from Address Resolution Table (113) to Packet Storage Table (220) to Free Buffer Pool (230) and finally to Transmit Descriptor Table (at output queue 206), thus, clearly suggesting that Address and Value are also received by the Transmit Descriptor Table. Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to adapt the Transmit Descriptor Table of Muller in view of Steiner to receive a Table Descriptor Address and

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a Table Descriptor Value as suggested by Muller by teaching adapting the Packet Storage Table to receive an Address and Value and further teaching steps (1) - (5) wherein packets are processed from Packet Storage Table to Free Buffer Pool and finally to Transmit Descriptor Table.

Regarding claims 16, 17, 35 and 36, Muller in view of Steiner teach the structure discussed above regarding claims 13 and 32, however, may not specifically require that the Transmit Descriptor Table (output queue) comprise a circular FIFO memory structure with head and tail pointers. However, Muller clearly teaches performing output queuing (output queues at output ports 206), and further, claims 16, 17, 35 and 36 were rejected in a previous office action by the Examiner taking official notice that the limitations recited in these claims are well known in the art. That is, a circular FIFO memory structure with head and tail pointers is well known in the art for implementing suitable output queuing. In Applicant's response to a previous office action, Applicant has not traversed the Examiner's assertion of official notice or Applicant's traverse is not adequate. Therefore, in accordance with MPEP 2144.03(C), the limitations recited in these claims comprise well-known art and are hereafter taken to be admitted prior art.

Regarding claims 19, 20, 38 and 39, Muller teaches the Free Buffer Pool further comprises a buffer control memory (e.g., tag array, see col. 9, line 57 - col. 10, line 45) comprising plural memory bits (e.g., represented by rows and columns) uniquely corresponding to ones of the pre-determined number of buffer pool memory locations.

Regarding claims 23 and 42, Muller teaches the structure further comprises a free buffer manager (e.g., shared memory manager comprising buffer tracking unit 329

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and coupled with switch fabric 210, see FIGS 2, 3B and 4) including: a buffer bus controller (e.g., buffer manager 325, see col. 9, line 5 - col. 14, line 37), a buffer bus register (e.g., arbitor 470), a buffer control finite state machine (e.g., array controller 450) operably coupled with the bus controller and the bus register, and a buffer search engine (e.g., search engine within block 210, see col. 6, lines 1-23) operably coupled with the bus controller, bus register, and finite state machine.

Regarding claims 24 and 43, Muller teaches the buffer bus controller comprises a buffer free bus controller (performed by buffer manager 325) for detecting a buffer request (Br_Ptr_IP-Bus Request) and presenting the request to at least one of the finite state machine and the buffer search engine (e.g., see col. 13, lines 5-14), and a buffer grant bus controller (performed by buffer manager 325) for granting an available free buffer (Br_Ptr_Data_BM_to_IP[X:0]) as indicated by the buffer bus register (e.g., see col. 13, lines 15-23).

Regarding claims 25 and 44, Muller teaches the buffer search engine comprises a pipelined buffer search engine by coupling learning logic (e.g., see col. 6, line 5) to the search engine for searching and maintaining the database 140.

Regarding claims 26, 27, 45 and 46, Muller in view of Steiner teach the structure discussed above regarding claims 23 and 42, however, may not specifically require that the buffer bus register comprise an eight-location LIFO. However, Muller clearly teaches performing queuing (output queues at output ports 206), and further, claims 26, 27, 45 and 46 were rejected in a previous office action by the Examiner taking official notice that the limitations recited in these claims are well known in the art. That is, LIFO

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is a queuing technique well known in the art. In Applicant's response to the previous office action, Applicant has not traversed the Examiner's assertion of official notice or Applicant's traverse is not adequate. Therefore, in accordance with MPEP 2144.03(C), the limitations recited in these claims comprise well-known art and are hereafter taken to be admitted prior art.

Response to Arguments

3. Applicant's arguments filed May 22, 2007 have been fully considered but they are not persuasive.

Referring to the argument that Ryals et al do not disclose the key being a predefined portion of the destination address (page 6, line 12 to page 7, line 2): Ryals et al disclose in Figure 4 that a cell is received at interface card 402 and stored in a cell slot of main buffer 404. An entry containing the pointer to the cell slot and the destination address contained in the cell is placed on a pending queue. Refer to Column 9, lines 15-30. The address information contained in an entry allows an interface card to determine the full address that corresponds to the entry. "For example, in a system where *a portion of the full address is used as an index to the entry*, the entry may contain the portion of the address that was not used as the index" (Column 10, lines 8-11). Therefore, a portion of the destination address can be used as a key (index) into the table. Refer to Column 9, line 15 to Column 10, line 17.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Ng whose telephone number is (571) 272-3124. The examiner can normally be reached on M-F; 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C. Ng 
July 25, 2007



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